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METHOD AND SYSTEM FOR COMMUNICATING DATA OVER A WIRELESS COMMUNICATION SYSTEM VOICE CHANNEL UTILIZING FRAME GAPS

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Examiner: Jason M. Perilla

Attorney Docket No. GP-304612

APPEAL BRIEF

Board of Patent Appeals and Interference
US Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

On July 16, 2009, Appellant filed a Notice of Appeal of the final rejection mailed April 16, 2009. This Appeal Brief is being filed in support of the appeal.

(i) Real Party in Interest

The real party in interest is General Motors Company LLC by virtue of a chain of title extending back to an original assignment from the inventors. General Motors LLC is a limited liability company having its principal place of business at 300 Renaissance Center, Detroit, Michigan 48265-3000.

(ii) Related Appeals and Interferences

There are no other appeals and/or interferences known to Appellant, his assignee, and/or legal representatives that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(iii) Status of Claims

Claims 1-19 have previously been canceled. Claims 20-42 were rejected in the final Office Action of April 16, 2009. The rejection of claims 20-42 is being appealed.

(iv) Status of Amendments

No amendment has been filed subsequent to the final rejection.

(v) Summary of Claimed Subject Matter

In accordance with 37 CFR 41.37(c)(1)(v), a concise explanation is provided below of subject matter defined in each of the independent claims involved in this appeal, with reference to the specification by page and line numbers and to the drawings by reference characters. Also in accordance with 37 CFR 41.37(c)(1)(v), for each dependent claim argued separately under the provisions of 37 CFR 41.37(c)(1)(vii), every means plus function as permitted by 35 U.S.C. 112, sixth paragraph, is identified and the structure, material, or acts described in the specification as corresponding to each claimed function is set forth with reference to the specification by page and line numbers, and to the drawings by reference characters.

Independent Claim 20 –

Claim 20 is directed to a method (500) of communicating data over a voice channel of a wireless communication system. The method includes the steps of generating a periodic data signal $S_{out}(t)$ modulated with data and periods of silence (Fig. 5, step 530, Page 13, lines 16-29), and sending the periodic data signal $S_{out}(t)$ as a voice communication through a vocoder and over a voice channel of a wireless communication system (Fig. 5, step 540, Page 14, lines 1-14). Further details concerning the generation of the periodic data signal $S_{out}(t)$ are described at Page 8, lines 7-12 in conjunction with Fig. 2, and an exemplary waveform $S_{out}(t)$ containing the periods of silence is shown in Fig. 4 and discussed at Page 12. The sending of the data signal $S_{out}(t)$ through a vocoder is inherent in the sending of the data signal via a voice channel of the disclosed network transmission standards (CDMA, TDMA, GSM).

Independent Claim 29 –

Claim 29 is directed to a method of communicating data over a voice channel of a wireless communication system. It includes the steps of:

establishing a cellular voice call over a voice channel of a wireless communication system 140 using a selected network transmission standard (Page 11, lines 1-11; Fig. 1 - call is routed from call center to vehicle telematics unit using, for example, CDMA);

generating a periodic data signal $S_{out}(t)$ modulated with (i) data using frequency shift keying and (ii) periods of silence at periodic time intervals (Fig. 5, step 530; Fig. 4; Page 11, lines 27-29; Page 13, lines 13-29); and

sending the periodic data signal $S_{out}(t)$ to a call center 170 over the voice channel of the wireless communication system (Fig. 5, step 540, Page 14, lines 1-14). The periodic data signal is sent over the wireless communication system 140 using a carrier signal that is transmitted during portions of the periodic data signal that contain the data and during portions of the periodic data signal that contain the periods of silence (Page 14, lines 1-14). The transmission of of $S_{out}(t)$ over a voice channel of any of the disclosed CDMA, TDMA, and GSM network transmission standards inherently involves the use of a carrier signal to transmit the data signal (including both the data and silent portions of the data signal) between the vehicle antenna and cell tower or other antenna of the wireless communication system.

Independent Claim 34 –

Claim 34 is directed to a method (500) of communicating data over a voice channel of a wireless communication system. The method includes the steps of generating a data signal that includes modulated data and periods of silence during which the data signal is unmodulated (Fig. 5, step 530; Fig. 4; Page 11, lines 27-29; Page 13, lines 13-29), and sending the data signal as a voice communication over a voice channel of a wireless communication system (Fig. 5, step 540, Page 14, lines 1-14).

Although the Appellant has provided the summary of claimed subject matter with references to specific embodiments of the invention to comply with the requirements set forth in the relevant provisions of 37 C.F.R., this summary has been provided to aid the Board in evaluating the appeal and is not intended to limit the meaning or definition of any terms in the claims. Furthermore, it should be appreciated that the above-provided reference numerals and pages/line numbers are only for exemplary purposes, as other instances and/or embodiments of the claimed elements could appear elsewhere in the application.

(vi) Grounds of Rejection to be Reviewed on Appeal

The issues on appeal are:

1. Whether claims 33-42 comply with the written description requirement of 35 U.S.C. § 112, first paragraph.

2. Whether claims 20-25, 29, 30, and 32 are unpatentable under 35 U.S.C. § 102(e) as being anticipated by Preston, US Patent No. 7,206,305.

3. Whether claims 26-28 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Preston in view of Gardner, US Patent No. 7,146,174.

4. Whether claim 31 is unpatentable under 35 U.S.C. § 103(a) as being obvious over Preston.

(vii) Argument

1) *Rejection of Claims 33-42 under § 112*

Claims 33-42 stand rejected under 35 U.S.C. § 112, first paragraph, as not being supported by a written description of their subject matter. The rejection is respectfully traversed because the application does clearly convey to one skilled in the art that, at the time of the filing of the original application, Appellants had possession of the subject matter being recited in claims 33 and 34. The offending language from claim 33 is "the periods of silence comprise frame gaps during which no frequency shift keying modulation occurs." For claim 34, the language of concern is the recitation of "a data signal that includes modulated data and periods of silence during which the data signal is unmodulated." In both cases, the specification provides ample support and description of these limitations. As stated in MPEP § 2163, "[w]hile there is no *in haec verba* requirement, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure." In the specification at Pages 11-12, it explains (1) that the periods of silence are referred to in the specification as frame gaps, (2) that the input periodic data signal $S_{in}(t)$ can be an FSK modulated data sequence, and (3) the control device 210 passes the (modulated) data signal during some time periods (e.g., t_0-t_1) and passes a period of silence during other time periods (e.g., t_1-t_2) to thereby produce the altered signal $S_{out}(t)$ of Fig. 4. Thus, one skilled in the art clearly understands that the altered signal $S_{out}(t)$ contains periods of silence (or frame gaps) during which the FSK modulation does not occur (claim 33), and similarly, that the signal $S_{out}(t)$ includes modulated data and periods of silence during which the data signal is unmodulated (claim 34). While this is not stated word-for-word the same as is used in the claim, one skilled in the art clearly understands it, and it is clearly and unambiguously shown in the drawings.

In the final rejection, the Examiner responded to the foregoing earlier presented argument by relying almost solely on an obviously erroneous singular statement from the original specification. In particular, the Examiner asserts that he does not consider the "periods of silence" to be a period of non-modulation "because it is against the weight of the disclosure of the specification as a whole,"[1] but then goes on to identify only a single statement from the original specification for support while ignoring and/or dismissing the explicit repeated contrary

discussion from the specification. That single statement is contained in the original specification at Page 12, lines 22-23 wherein it stated that "$S_{out}(t)$ provides a continuous modulated data signal." However, as described in the remaining portions of that page of the specification, and as explicitly shown in Fig. 4, $S_{out}(t)$ is in fact a discontinuous signal and this would be immediately and unambiguously clear to one skilled in the art.

The Examiner attempts to dismiss Appellants' Fig. 4 and the associated discussion of $S_{out}(t)$ by asserting that "figure 4 is merely representative of the functional input/output of block 210 of figure 2" and that "figure 4 is merely a functional representation illustrating the manner in which Sin is interleaved over time with periods of silence."[2] It is not entirely clear what the Examiner means by these statements and at least the second does not appear to contradict what Appellants are asserting about Fig. 4; namely, that it is the $S_{out}(t)$ periodic data signal of the illustrated embodiment and that its periods of silence from t_1 to t_2, from t_3 to t_4, and from t_5 to t_6 are unmodulated as recited in claim 34. Also, the Examiner later states that "figures 3 and 4 are provided only as an [sic] representation of the underlying method of the invention and do not represent the actual input/output of the protocol transmission device 210 of figure 2."[3] This is clearly contrary to the express disclosure of the specification; for example, see Page 12, lines 1-2, which state "FIG. 4 is a waveform diagram of the modulated protocol transmission $S_{out}(t)$." Thus, again, it is clear to those skilled in the art that the periodic data signal $S_{out}(t)$ is shown in Fig. 4 and includes periods of silence during which the signal is unmodulated. Hence, contrary to what the Examiner asserts, the "weight of the disclosure of the specification as a whole" clearly demonstrates that the subject matter of claims 33 and 34 was present in the original specification and that one of ordinary skill in the art would understand that Appellants were in possession of the subject matter of these claims. Furthermore, with respect to claim 33, it is clear from Appellants' Fig. 4 as well as the corresponding discussion in the specification that there is no frequency shift keying modulation occurring during the periods of silence (frame gaps) as recited in that claim.

Accordingly, Appellants respectfully request Board action to overturn the Examiner's rejection of independent claims 33-42.

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[1] Final Office Action dated April 16, 2009, Page 2.
[2] Final Office Action dated April 16, 2009, Page 2 bridging over to Page 3
[3] Final Office Action dated April 16, 2009, Page 4

2) *Rejection of Claims 20-25, 29, 30, and 32 under § 102*

The primary issue surrounding the rejections based on Preston is whether or not Preston's "sacrificial bits" used in the preamble and postamble of its in-band signaling (IBS) packet constitute the "periods of silence" recited in independent claims 20 and 29. Appellants respectfully submit that they do not for the reasons discussed below.

As discussed in some of Appellants' prior responses, the rejection of each of the claims 20-32 is predicated on the Examiner's interpretation from Preston that the sacrificial bits contained in the IBS packet 70 constitute "periods of silence" as recited in independent claims 20 and 29. Appellants respectfully submit that this interpretation is incorrect and wholly without support in the prior art or in the record. Preston clearly shows that these sacrificial bits are 1's and 0's that are converted to tones using frequencies f1 and f2. And, as is clearly known to those skilled in the art, and as is easily ascertainable by dictionary lookup, a tone is not silence, but a sound, which is the opposite of silence. To interpret the phrase "periods of silence" as reading on tones generated using a sequence of sacrificial (i.e., non-data bearing) bits, is to interpret that phrase as covering completely the opposite of what it clearly and unambiguously means. This is not reasonable and goes beyond affording the claim language the "broadest reasonable interpretation" available.

Furthermore, the fact that the sacrificial bits contain no useful data does not make them "periods of silence." They are still modulated using the frequencies f1 and f2 and thus still produce tones, and this is explicitly disclosed by Preston at Col. 6, lines 24-31, where it states that "tones [] are generated for these sacrificial bits." The final rejection asserts that Appellants have argued that Preston's sacrificial bit "tones" are not "silent" periods. This is not what Appellants stated, but rather, Appellants argued in a prior response that Preston's sacrificial bit "tones" are not "periods of silence" as recited in the claims. That argument is still deemed fully applicable and has not been properly rebutted. For example, the statement in the most recent Office Action that Preston's "'tones' of the sacrificial bits are nonetheless 'silent' because they communicate no representative data" is not the proper inquiry because (1) the claim specifies "periods of silence", which tones are not and (2) the Examiner's statement focuses on the content carried by the signal (i.e., the meaning or meaninglessness of the data being carried by the tones), rather than on whether or not the signal includes "periods of silence."

The Examiner has continued to rely on the now-corrected obvious error from the original specification (stating that $S_{out}(t)$ is a "continuous" modulated data signal) to argue that "periods of silence" do not mean what the plain language of that phrase would indicate. In particular, the Examiner asserts that Appellants' specification is "wholly indefinite" with reference to what constitutes "periods of silence" and, in support of this, the Examiner notes that Fig. 4 depicts both periods of data and periods of silence, but then concludes that it is not clear what constitutes the periods of silence because of the statement on Page 12 of the specification that the output data signal is a "continuously" modulated signal. Appellants appreciate that this statement has caused some confusion for the Examiner; however, this singular, obvious error in the specification does not eliminate what is otherwise a clear teaching to those skilled in the art. As discussed above, one skilled in the art will understand that the word "continuous" was in error and that "discontinuous" was meant instead. This error was corrected in the last entered amendment, and there is now no possibility of indefiniteness with respect to the claimed "periods of silence". Rather, as indicated in Fig. 4, the periods of silence can be implemented by reducing the signal to zero, and those skilled in the art may know or develop other suitable ways of supplying the periods of silence.

The Examiner has also asserted that Appellants' "periods of silence" include "periods of modulation without data."[4] It is unclear what the Examiner means by this latter phrase since even Preston's sacrificial bits are not non-data, but rather they are just sacrificial or throw-away data that does not include any of the data from the data stream 29 obtained from the data source 30. See Col. 6, lines 24-27 and Fig. 5 of Preston, which shows that the sacrificial bits do contain data, but just not any of the data bits 29.

To sum up, Appellants submit that, as shown in Fig. 5 of Preston, the sacrificial bits are 1's and 0's that are modulated using the two different frequencies shown in Fig. 6, and therefore do not constitute "periods of silence" within a data signal. Nor does Preston anywhere suggest generating such a signal. Accordingly, Appellants respectfully request that the rejections of claims 20-25, 29, 30, and 32 under § 102 be reversed.

[4] Final Office Action dated April 16, 2009, Page 4.

Claim 25 is Separately Patentable Over Preston

Apart from its allowability on the basis of its dependence from claim 20, claim 25 is separately patentable since Preston does not teach using a periodic data signal to generate another periodic data signal, rather it teaches creating a modulated data signal which, as shown in Preston's Fig. 4, is done using digital data from packet formatter 62 and two frequencies 66, 68, none of which are themselves a periodic data signal. Thus, Preston does not create an altered or modulated periodic data signal from another periodic data signal. The Examiner asserts that data source 30 of Preston's Fig. 4 is a periodic data signal; Appellants respectfully disagree. Data source 30 is, for example, a cell phone, laptop or GPS receiver that provides digital data 29 in the form of bits that are stored in a buffer 58, packetized at 60, and then packet formatted with the sacrificial bits being added at 62. As is understood by those skilled in the art, all of this processing of blocks 58-62 is done using digital data stored as bits, not using a periodic signal such as shown in Appellants' Fig. 3. This is also explicitly shown at 29 in Figs. 1 and 2 of Preston and is explained at Col. 3, lines 58-63, and Col. 4, lines 16-23.

Thus, even to the extent that the Examiner asserts that Preston's sacrificial bits are periods of silence, those bits are not applied according to the step recited in claim 25 wherein an already existing periodic data signal is modulated with periods of silence to produce a second periodic data signal. Rather, Preston's sacrificial bits are applied in the packet formatter 62 (See Col. 5, lines 2-6, lines 32-34, and lines 44-51) as a part of generating its first and only periodic data signal that is then sent to the vocoder (voice coder). Nor has the Examiner identified anything from Preston or the other prior art of record that would provide any reason for one of ordinary skill in the art to abandon the approach taught by Preston for inserting the sacrificial bits and instead generate the modulate periodic data signal 69 in Fig. 4 and then further modulate that signals at particular locations to add on the sacrificial bits. Thus, claim 25 patentably defines over Preston and the other applied references independently of its dependence from claim 20.

3) *Rejection of Claims 26-28 under § 103*

With respect to the rejection of claims 26-28, as stated in Appellants' last response, Gardner has been cited only for its applicability to the additional limitations added in these dependent claims. However, Gardner does not make up for the above-noted deficiencies of

Preston. That is, there is nothing from Gardner that teaches or suggests generating a modulated periodic data signal having periods of silence. Accordingly, claims 26-28 also patentably define over these references.

Claim 26 is Separately Patentable Over Preston and Gardner

Claim 26 ultimately depends from claim 20 and should be allowed therewith for the reasons discussed above in connection with claim 20. Claim 26 depends directly from claim 25 and should be allowed therewith independently of its allowance based on claim 20 for the reasons discussed above in connection with claim 25. Claim 26 is also separately patentable because neither Preston, Gardner, nor the other prior art of record teach or suggest all of the limitations expressly included in claim 26.

The disclosure from Gardner cited by the Examiner relates to rate control of vocoders, which is used to set the data rate used by a wireless communication system in transmitting speech or data between antennas. The rate of data transmission used by a vocoder has nothing to do with deciding how long a period of silence to insert into a modulated periodic data signal prior to it even arriving at the vocoder. Nor would applying Gardner's vocoder rate determination teachings to Preston result in any change in Preston's sacrificial bit length. Nor has the Examiner even shown that Preston teaches changing the length of or timing between groups of sacrificial bits. Furthermore, the Examiner's assertion that control signals are notoriously well known does not mean that it is known to use a control signal in the manner recited by Appellants in claim 26. That claim recites receiving a control signal that supplies parameters for the length of the periods of silence and timing between them, and then that the control signal is used in modulating the first periodic data signal to produce the second periodic data signal. Preston does not teach changing these features of its sacrificial bits, nor does Gardner. The cited portions of Gardner's teaching relates not to the length or timing of periods of silence or sacrificial bits, but to the rate at which data is transmitted. And even as to the data rate teachings of Gardner, they are data rates of the vocoder, not a data modulation rate used to encode data sent to the vocoder. Thus, the cited portions of Gardner are minimally relevant, if at all, and do not provide any reason why one of ordinary skill in the art would have seen it obvious to control the length and timing of periods of silence that are modulated onto a periodic data signal, as recited in claim 26. Accordingly, Appellants respectfully submit that claim 26

patentably defines over Preston and Gardner independently of its dependence from claims 20 and 25.

4) *Rejection of Claim 31 under § 103*

Appellants respectfully submit that the rejection of claim 31 under § 103 should be reversed on the same basis as discussed above in connection with claim 29. For the reasons discussed above, Preston's sacrificial bits are not "periods of silence" as recited in claim 29. Nor has the Examiner provided any proper reasoning or basis as to how and why the claimed "periods of silence" would have been obvious to one of ordinary skill in the art given the teachings of Preston. In fact, they would not and Appellants therefore respectfully request that the rejection of claim 31 be reversed.

Conclusion

In view of the foregoing, Appellants respectfully submits that the rejections of all pending claims in this case are improper. Accordingly, Appellants request Board action to overturn the Examiner's rejections.

The Commissioner is hereby authorized to charge any deficiencies, or credit any overpayment associated with this appeal brief to Deposit Account No. 07-0960.

Respectfully submitted,

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(viii) Claims Appendix

1-19. **(Cancelled)**

20. A method of communicating data over a voice channel of a wireless communication system, comprising the steps of:

generating a periodic data signal modulated with data and periods of silence; and

sending the periodic data signal as a voice communication through a vocoder and over a voice channel of a wireless communication system.

21. The method of claim 20, wherein the wireless communication system is a cellular network.

22. The method of claim 20, wherein the network transmission standard is CDMA, TDMA, or GSM.

23. The method of claim 20, wherein the generating step further comprises generating the periodic data signal with a data sequence using frequency shift keying.

24. The method of claim 20, wherein the duration of each of the periods of silence is within the range of about 25 milliseconds to about 1000 milliseconds.

25. The method of claim 20, wherein the generating step further comprises receiving a first periodic data signal and producing a second periodic data signal by modulating the first periodic data signal with the periods of silence.

26. The method of claim 25, wherein producing the second periodic data signal further comprises the steps of:

receiving a control signal, the control signal supplying parameters for a length of the periods of silence and timing between the periods of silence; and

producing the second periodic data signal by modulating the first periodic data signal based on the received control signal.

27. The method of claim 20, wherein the length of the periods of silence are variable.

28. The method of claim 27, further comprising the steps of:

receiving a response to the periodic data signal over the voice channel of the wireless carrier network; and

varying the length of the periods of silence based on the response.

29. A method of communicating data over a voice channel of a wireless communication system, comprising the steps of:

establishing a cellular voice call over a voice channel of a wireless communication system using a selected network transmission standard;

generating a periodic data signal modulated with (i) data using frequency shift keying and (ii) periods of silence at periodic time intervals; and

sending the periodic data signal to a call center over the voice channel of the wireless communication system, whereby the periodic data signal is sent over the wireless communication system using a carrier signal that is transmitted during portions of the periodic data signal that contain the data and during portions of the periodic data signal that contain the periods of silence.

30. The method of claim 29, further comprises the steps of:

(a) generating the periodic data signal using frequency shift keying; and

(b) modulating the periodic data signal with periods of silence that are added at the periodic time intervals.

31. The method of claim 30, wherein step (a) is carried out prior to step (b).

32. The method of claim 29, wherein the network transmission standard is CDMA, TDMA, or GSM.

33. The method of claim 29, wherein the periods of silence comprise frame gaps during which no frequency shift keying modulation occurs.

34. A method of communicating data over a voice channel of a wireless communication system, comprising the steps of:

generating a data signal that includes modulated data and periods of silence during which the data signal is unmodulated; and

sending the data signal as a voice communication over a voice channel of a wireless communication system.

35. The method of claim 34, wherein the wireless communication system is a cellular network.

36. The method of claim 34, wherein the network transmission standard is CDMA, TDMA, or GSM.

37. The method of claim 34, wherein the generating step further comprises generating the data signal with a data sequence using frequency shift keying.

38. The method of claim 34, wherein the duration of each of the periods of silence is within the range of about 25 milliseconds to about 1000 milliseconds.

39. The method of claim 34, wherein the generating step further comprises receiving a first periodic data signal and producing a second periodic data signal by modulating the first periodic data signal with the periods of silence.

40. The method of claim 39, wherein producing the second periodic data signal further comprises the steps of:

receiving a control signal, the control signal supplying parameters for a length of the periods of silence and timing between the periods of silence; and

producing the second periodic data signal by modulating the first periodic data signal based on the received control signal.

41. The method of claim 34, wherein the length of the periods of silence are variable.

42. The method of claim 41, further comprising the steps of:

receiving a response to the data signal over the voice channel of the wireless carrier network; and

varying the length of the periods of silence based on the response.

(ix) Evidence Appendix

None.

(x) Related Proceedings Appendix

None.